REMARKS

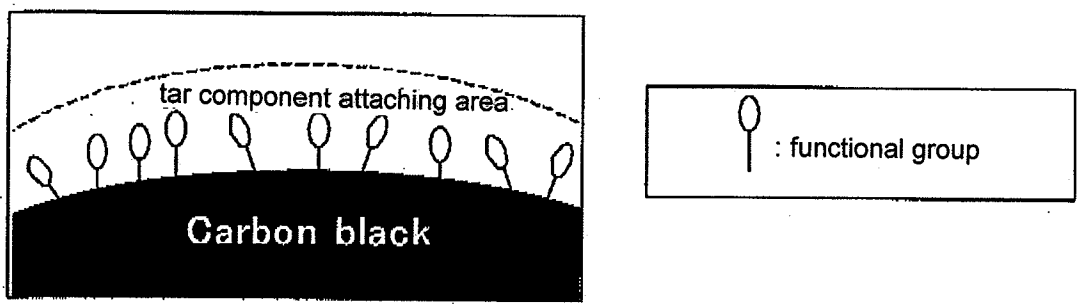
Claims 1, 3-6, 9-10, 12-15 and 18 are pending in the application. Claims 2, 7-8, 11 and 16-17 have been cancelled. Claim 1 has been amended to incorporate the limitations of claims 2, 7 and 8 therein. Hence, the amendment to claim 1 does not constitute new matter, and thus entry is respectfully requested.

I. Rejection under 35 U.S.C. § 103(a)

The Office rejects claims 1-18 under 35 U.S.C. § 103(a) as being unpatentable over either Kurihara et al (JP 10-036703) or Iwama et al (U.S. Patent No. 4,550,135) in view of Chuvaldin (SU 1700028 A1, Derwent Abstract). The Office Action alleges that either Kurihara et al or Iwama et al discloses each feature of instant claims 1-18, except for the specific light transmittance of toluene extract and the specific relationship between the N_2SA and light transmittance. However, the Examiner alleges that Chuvaldin et al remedies these deficiencies and that it would allegedly have been obvious to have combined Chuvaldin et al with either of Iwama et al or Kurihara et al in order to have obtained the claimed features. The Examiner further asserts that, absent evidence to the contrary, the equations recited in instant claims 1-3 would have been inherent in the combined references.

Applicants incorporate the subject matter of claims 2, 7 and 8 into claim 1, and respectfully traverse the rejection.

As background information, there are functional groups and tar components on the surface of carbon black, which are derived from the raw material for carbon black, as seen in the following figure.



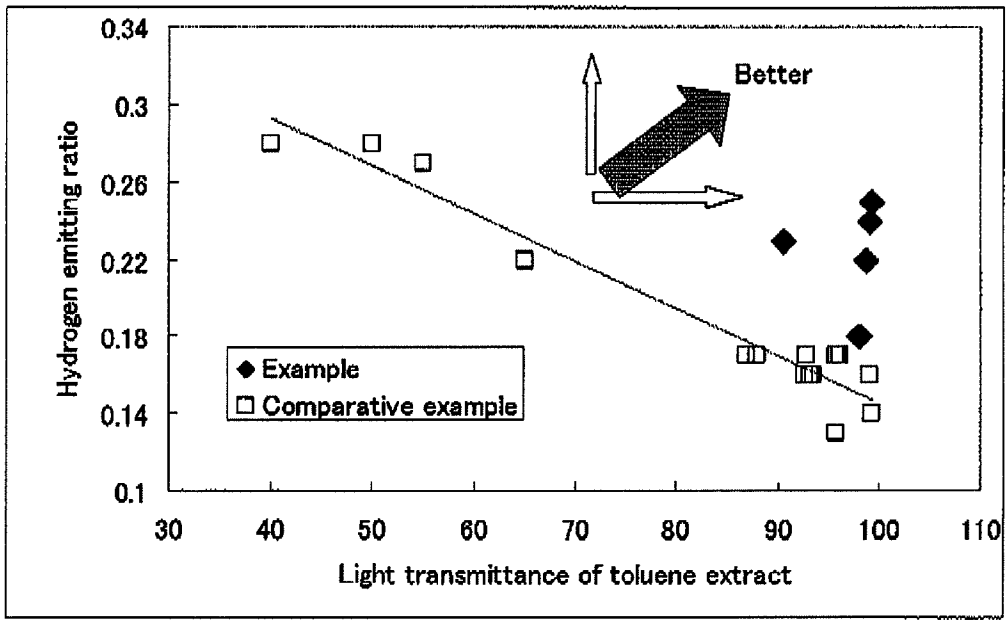
The functional groups on the surface of the carbon black are oxidized and removed at high temperature to generate hydrogen gas, or the like. Moreover, it is known that carbon black, which is produced by heating at high temperature, has a higher light transmittance of toluene extract. This occurs because the tar component on the surface of the carbon black is oxidized and removed at high temperature, thereby reducing the tar component by heating. Thus, in the present claims, the amount of the tar component existing on the surface of the carbon black is defined in relation to the light transmittance of toluene extract of the carbon black, and the number of functional groups existing on the surface of the carbon black is defined as a hydrogen emitting ratio at 2000°C.

When the light transmittance of toluene extract of the carbon black is 90% or more, the tar component existing on the surface is sufficiently small such that a composite between the carbon black and the rubber component is formed. This causes the wear resistance of the

rubber composition to be considerably improved, while at the same time, the heat buildup of the rubber composition can be lowered (see [0014]).

However, the hydrogen emitting ratio at 2000°C (i.e., related to the number of functional groups) of the carbon black is reduced as the tar component of the carbon black is reduced. When the number of the functional group existing on the surface of the carbon black is reduced, the reaction points between the diene polymer and the carbon black are also reduced, thereby compromising the wear resistance of the rubber composition.

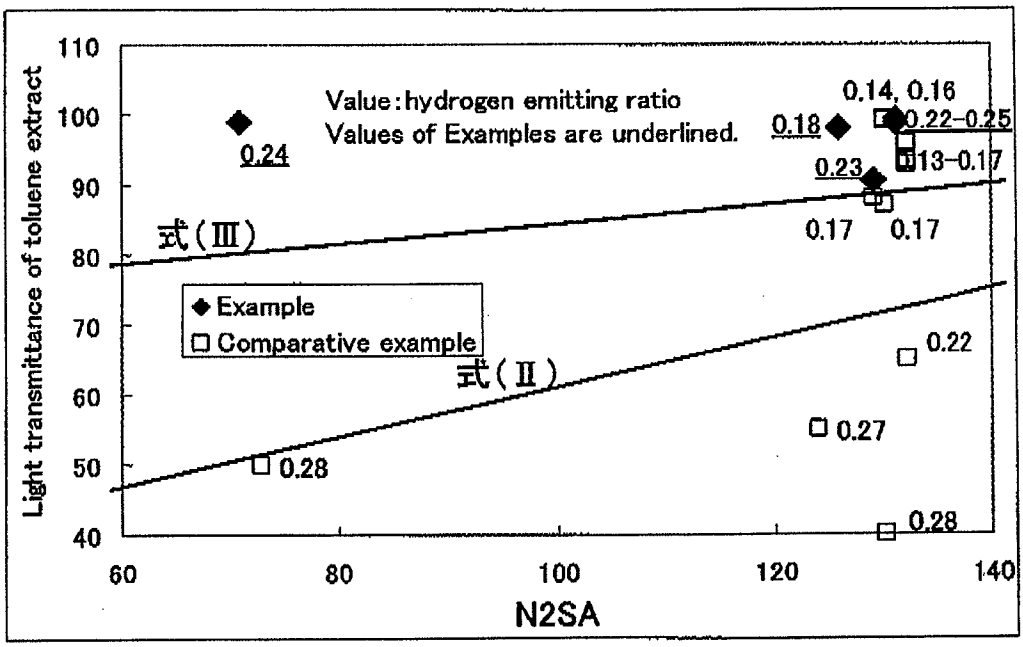
Hence, the carbon black used in the present invention has many functional groups, yet only a small amount of the tar component. Below is graph illustrating the relationship between the light transmittance of toluene extract and the hydrogen emitting ratio at 2000°C of the carbon black used in the Examples and Comparative examples.



As seen from the above graph, there is a tradeoff relation between the light transmittance of toluene extract and the hydrogen emitting ratio at 2000°C.

The carbon black used in the Comparative examples is near or on the line. To the contrary, the carbon black used in the Examples according to the present invention is far from the line, indicating that it has many functional groups having an effect on improving the wear resistance, while at the same time, has a small amount of the tar component having an adverse effect on low heat buildup.

The carbon black used in the Examples satisfies the relationship defined by formula (II) in amended claim 1. That relationship is described below.



As seen from the above graph, the hydrogen emitting ratio at 2000°C of the carbon black used in the Comparative Examples is reduced as the light transmittance of toluene extract is increased. However, the carbon black used in the Examples of the present invention has a larger hydrogen emitting ratio at 2000°C as compared with the carbon black used in the Comparative Examples, yet has a similar light transmittance of toluene extract.

To the contrary, none of Kurihara et al. (JP 10-36703), Iwama et al. (US 4,550,135) and Chuvaldin (SU 1700028 Al) disclose the hydrogen emitting ratio at 2000°C of the carbon black. Further, Kurihara, Iwama and Chuvaldin do not disclose the carbon black as satisfying equation (II) of amended claim 1.

As mentioned above, there is a trade-off relation between the light transmittance of toluene extract and the hydrogen emitting ratio at 2000°C. In this respect, even if one skilled in the art used the carbon black having a light transmittance of toluene extract of not less than 90% as described in Chuvaldin, that would not have been a carbon black having a hydrogen emitting ratio at 2000°C of not less than 0.18%. In this regard, the features of instant amended claim 1, from which all claims depend, would not have been not obvious over Kurihara, Iwama and Chuvaldin. Moreover, the claimed features are improvements over the state of the art in that the wear resistance of the rubber composition can be improved, while at the same time, heat buildup of the rubber composition is lowered (please see [0014] and [0023]). Such effects are nowhere disclosed in, nor would they have been obvious over, any combination of Kurihara, Iwama and Chuvaldin.

II. Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The U.S. Patent and Trademark Office is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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Date: September 3, 2008